0832 Dot Matrix Yellow Display Information Board User's Guide

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NOTES:

Product Version ： Ver 1.0

Document Version ： Ver 1.0

Chapter1.Overview

1.1. Welcome

Thanks for using 8*32 dot-matrix LED series info board by Sure Electronics. You may refer to the following table for members of the 8*32 product family. It is required to use peripheral circuit to light up this kind of info board via the port on the board itself. This info board can cascade as many as 4 pieces together to fulfill various needs of users （such as displaying different contents）and Sure Electronics provides 16-pin flat cable to facilitate the connection.

This info board employs HT1632 as its LED drive chip. Meanwhile, the LED dot-matrix displayed is mapped with the RAM of HT1632. It supports PWM adjustment in 16 grades. Sure Electronics has provided a tailored demo board so that users can light up this info board.

No.	Color of LED
DE-DP104V110	Fig 1.1 Red
DE-DP105V110	Fig 1.2 Green
DE-DP106V110	Fig 1.3 Yellow



Fig 1.1. Red LED info board

Overview



Fig 1.2.Green LED info board

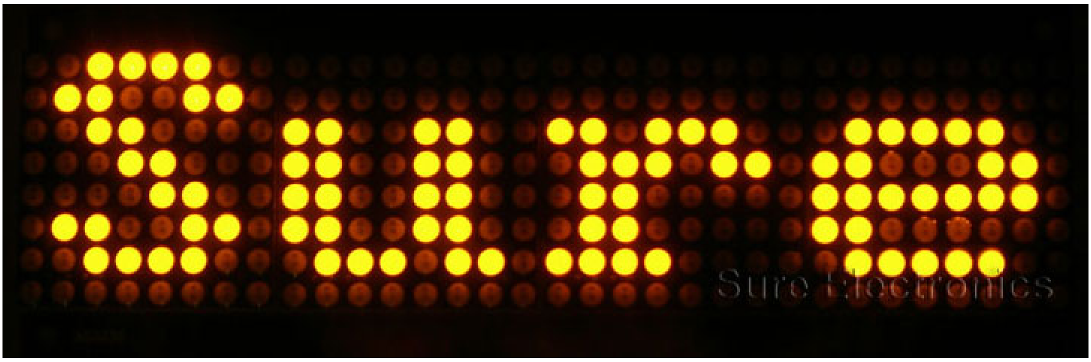


Fig 1.3. Yellow LED info board

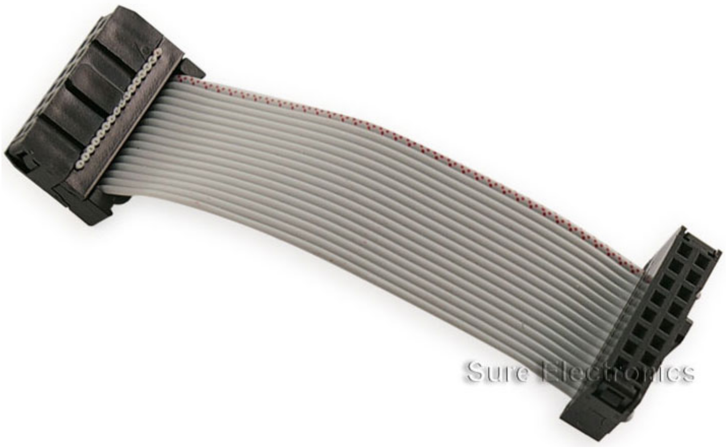


Fig 1.4. Flat cable

1.2. Quick Start

（1） Use with singular board

According to the pinout of the 8*32 board, there are 4 equivalent pins marked as CS1, CS2, CS3 and CS4 and they are associated with the 4-slide DIP switch on the reverse side of the 8*32 board. Each of which can be selected as the switch for the entire 8*32 board, so before connecting with drive board, make sure the slide of the pre-selected pin for switching on & off the 8*32 board has been pushed to "ON". As long as the time sequence of HT1632 can be met, the LED info board can be lit up. You may refer to “Port Definition” in Chapter 2 “Hardware Detail”.

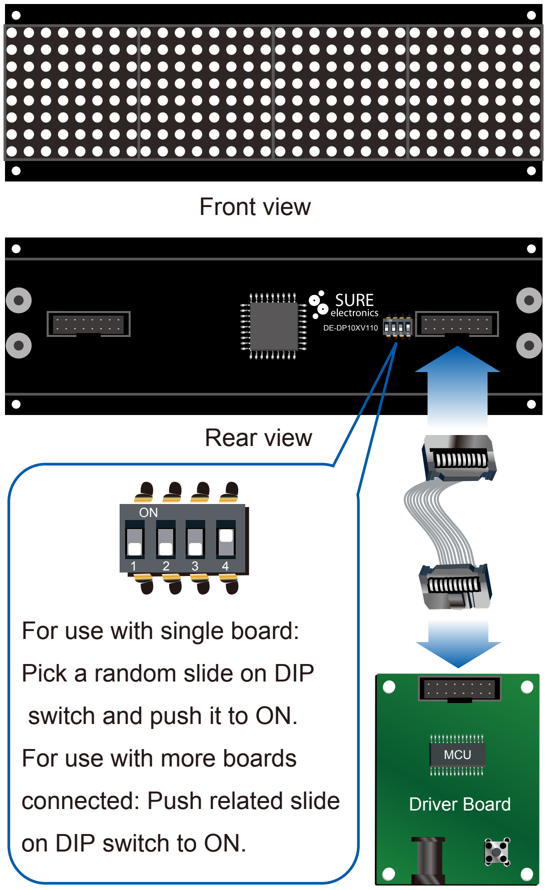


Fig 1.5. Connection of 8*32 LED and drive board

（2） Use of boards cascaded

Similar to the use of singular board, the use of cascaded boards requires you to push related switch on SW1 to “ON”. The adjacent LED boards shall be connected with flat cable and you may cut reserved V-CUT sides off if you want adjacent boards to be closer to each other. You may refer to Fig 1.6, 1.7 and 1.8 for detail.

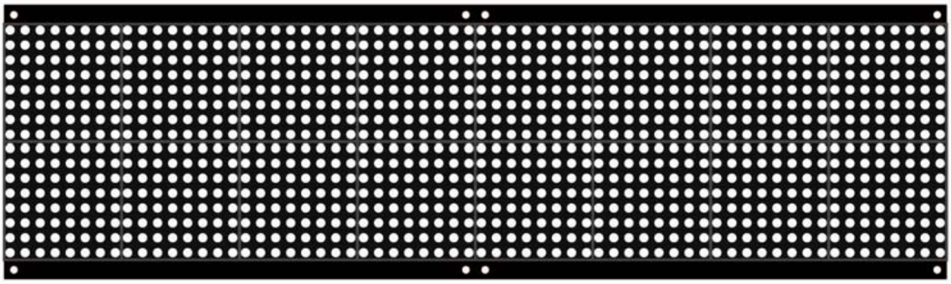


Fig 1.6. Connection schematic of cascaded 8*32 (16*64)

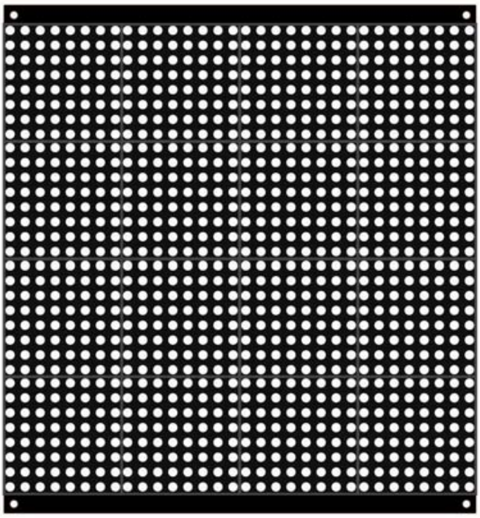


Fig 1.7. Connection schematic of cascaded 8*32 (32*32)

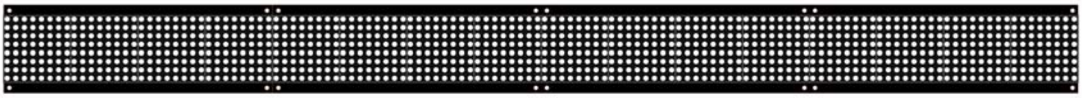
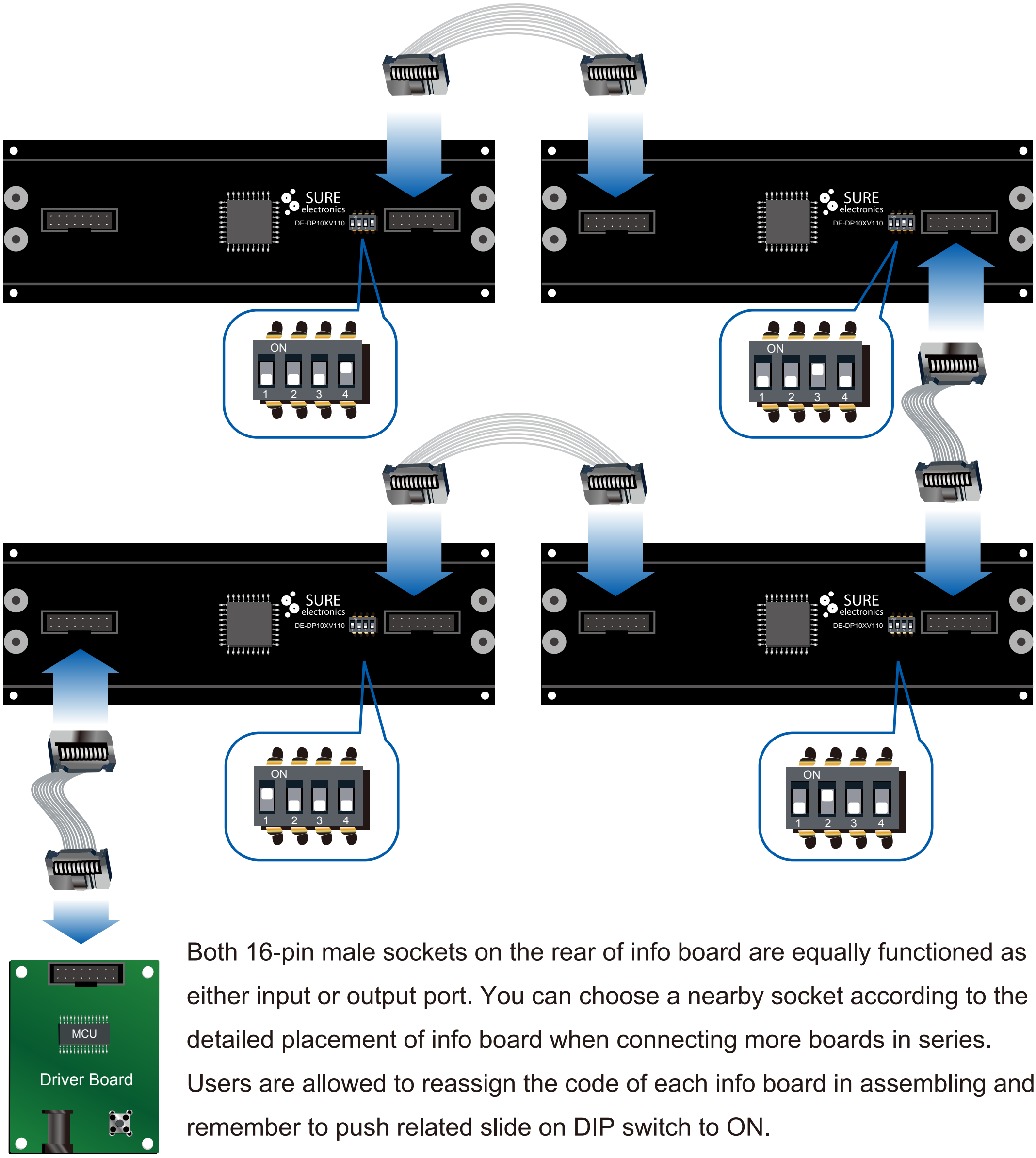


Fig 1.8 . Connection schematic of cascaded 8*32 (8*128)



Both 16-pin male sockets on the rear of info board are equally functioned as either input or output port. You can choose a nearby socket according to the detailed placement of info board when connecting more boards in series. Users are allowed to reassign the code of each info board in assembling and remember to push related slide on DIP switch to ON.

Fig 1.9. The rear wiring diagram of 8*32 dot-matrix info board (16*64 32*32 8*128)

Note: The diagrams above are used for reference only.

Chapter2.Hardware Detail

2.1. Hardware Components

(1) 4 pieces of 8*8 LED dot-matrix LED display

(2) LED drive chip: HT1632. Packaging: QFP

(3) 4-way DIP switch: Push related switch for cascaded connection

(4) 16-pin male socket: port for data, clock and control signal and +5V supply input

(5) Reserved +5V power port for DC In, which can be used to compensate the current supply when more boards are cascaded

2.2. Port Definition

Pin Number	Pin Name	Function Description
1，2，3，4	CS2，CS3，CS1，CS4	Transfer ON/OFF command from DIP switch to 8*32 LED
5	WR	Pin for clock signal to write in
6	RD	Pin for read clock signal
7	DATA	Serial data
8，11，13，15	GND	GND
9	OSC	If the system clock is sourced from an external clock source, the external clock source should be connected to this pin. If the on-chip RC oscillator is selected, this pin can be connected to a high or low level. If the cascade mode is selected. this pin is the driver clock signal
10	SYNC	Cascade synchronization input and output
12，14，16	+5V	+5V Power supply

2.3. Electrical Characteristics

DC characteristics

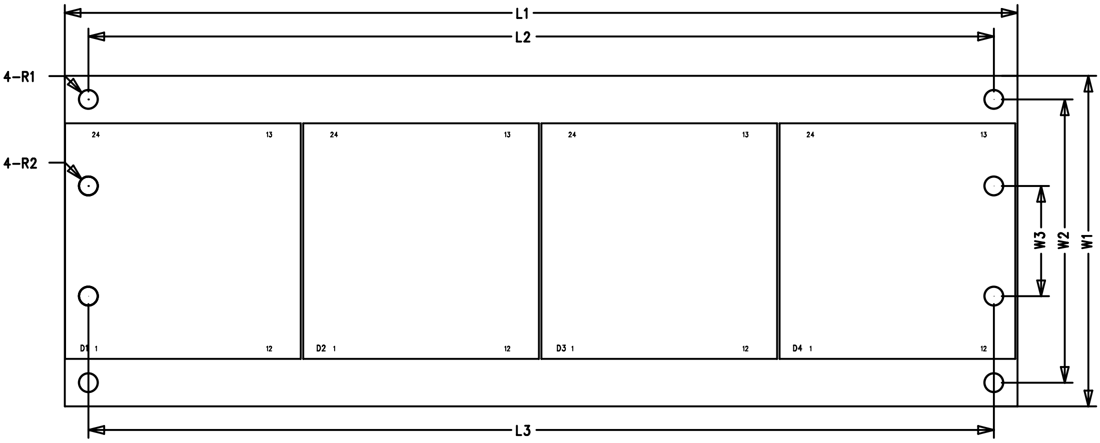
Parameters	Symbol	Absolute Maximum Rating	Units
Working Voltage	Vin	5	V
Operating Temperature	Topr	-20~80	℃
Storage Temperature	Tstg	-20~85	℃
Operating current （LEDs on，PWM 16/16 duty）	Ired	220	mA
	Igreen	220	mA
	Iyellow	210	mA

AC characteristics

Dot scan more than 800Hz

Row scan , Column scan more than 100Hz

2.4. Mechanical Drawing



Symbol	L1	L2	L3	R1	R2	W1	W2	W3
Inch	6.05	5.75	5.75	0.06	0.06	2.10	1.80	0.70
Mm	153.67	146.05	146.05	1.52	1.52	53.34	45.72	17.78

Chapter3.Note

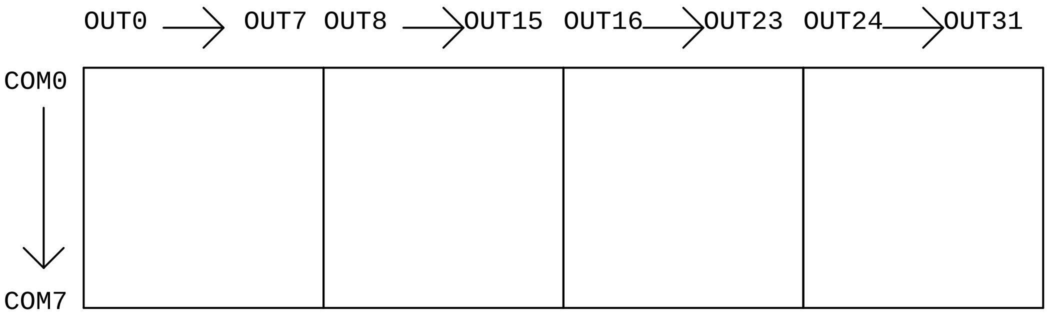
3.1. Display Memory

The static display memory, RAM, is organized into 64*4bits or 96*4 bits to store the display data. Our product is designed in 32 out bits & 8 commons mode, so the RAM size is 64*4 bits. The contents of the RAM are directly mapped into the contents of the LED driver. Data in the RAM can be accessed by the READ, WRITE, and READ-MODIFY-WRITE commands. the following table shows the mapping from the RAM to the LED pattern:

	Com7	Com6	Com5	Com4	Addr.	Com3	Com2	Com1	Com0	Addr.
Out0					01H					00H
Out1					03H					02H
Out2					05H					04H
Out3					07H					06H
Out4					09H					08H
Out5					0BH					0AH
Out6					0DH					0CH
Out7					0FH					0EH
Out8					11H					10H
Out9					13H					12H
Out10					15H					14H
Out11					17H					16H
Out12					19H					18H
Out13					1BH					1AH
Out14					1DH					1CH
Out15					1FH					1EH
Out16					21H					20H
Out17					23H					22H
Out18					25H					24H
Out19					27H					26H
Out20					29H					28H
Out21					2BH					2AH
Out22					2DH					2CH
Out23					2FH					2EH
Out24					31H					30H
Out25					33H					32H

Out26					35H					34H
Out27					37H					36H
Out28					39H					38H
Out29					3BH					3AH
Out30					3DH					3CH
Out31					3FH					3EH
	D3	D2	D1	D0	Data	D3	D2	D1	D0	Data

The corresponding relation of dot on LED dot matrix board and LED RAM is as follows:

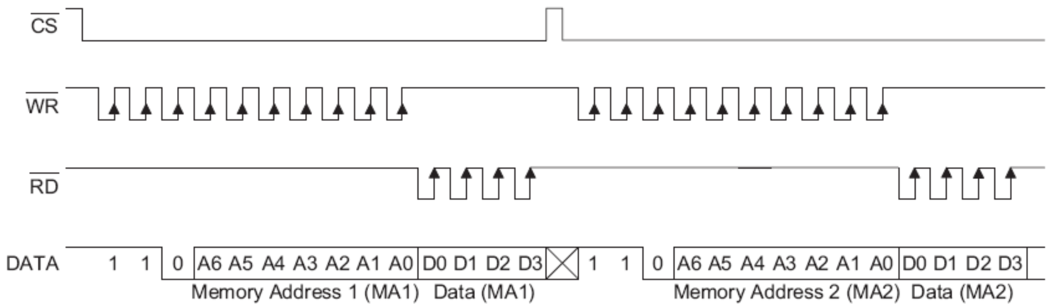


3.2. Command Format

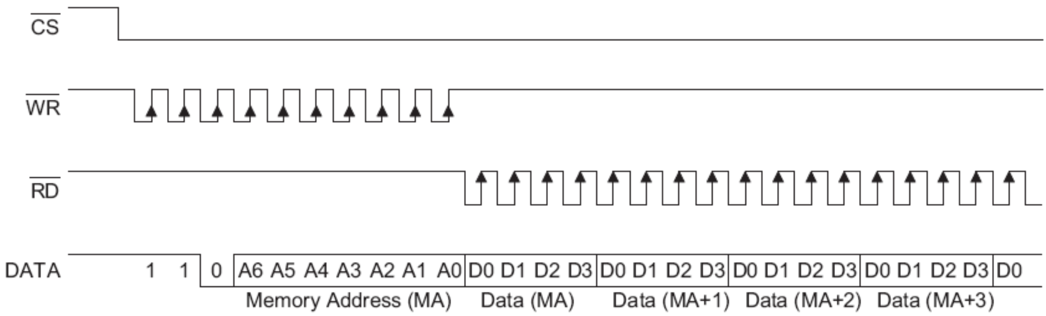
The command mode consists of a system configuration command, a system frequency selection command, a LED configuration command, and an operating command. The data mode, on the other hand, includes READ, WRITE, and READ-MODIFY-WRITE operations. The mode of command should be issued before the data or command is transferred. If successive commands have been issued, the command mode ID, namely 1 0 0, can be omitted. While the system is operating in the non-successive command or the non-successive address data mode, the CS pin should be set to “1” and the previous operation mode will be reset also. Once the CS pin returns to “0”, a new operation mode ID should be issued first.

Timing Diagram

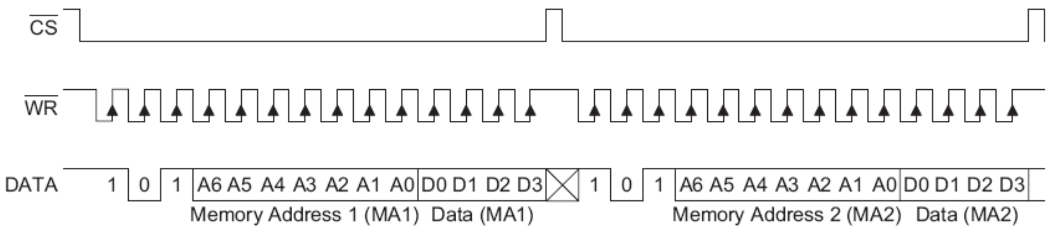
READ Mode – Command Code = 1 1 0



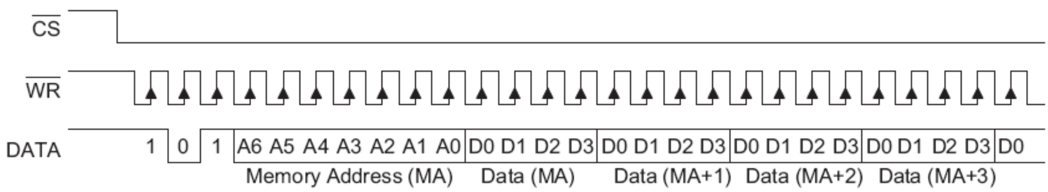
READ Mode – Successive Address Reading



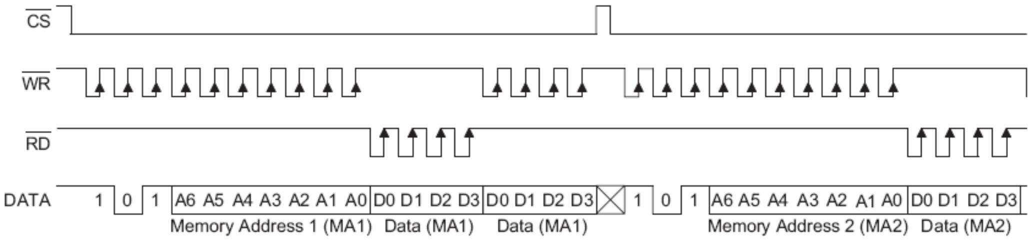
WRITE Mode – Command Code = 1 0 1



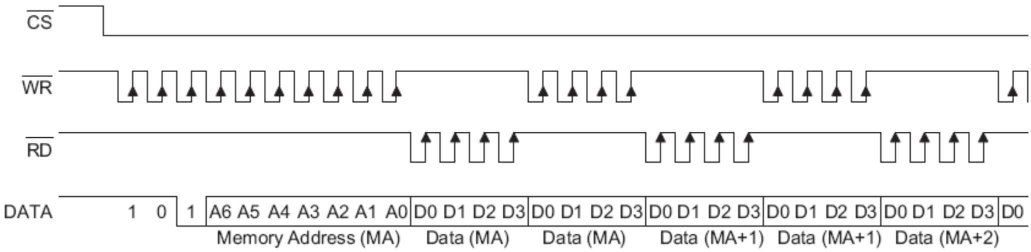
WRITE Mode – Successive Address Writing



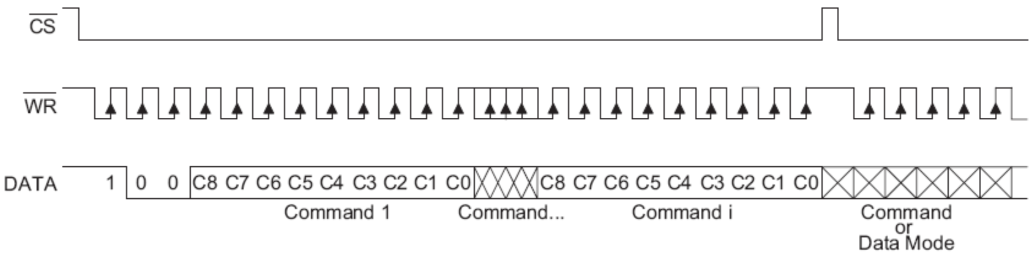
READ-MODIFY-WRITE Mode – Command Code = 1 0 1



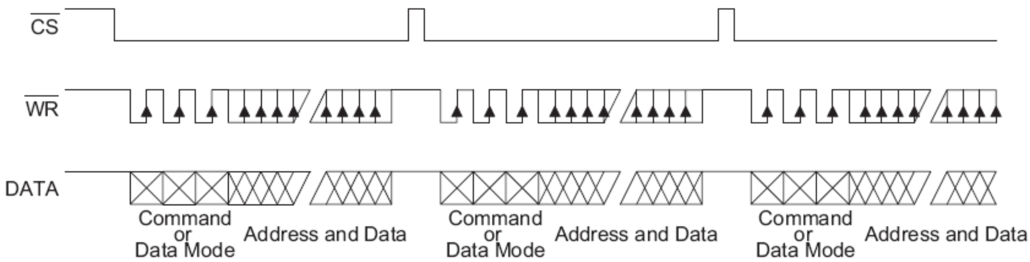
READ-MODIFY-WRITE Mode – Successive Address Accessing



Command Mode – Command Code = 1 0 0



Mode – Data and Command Mode

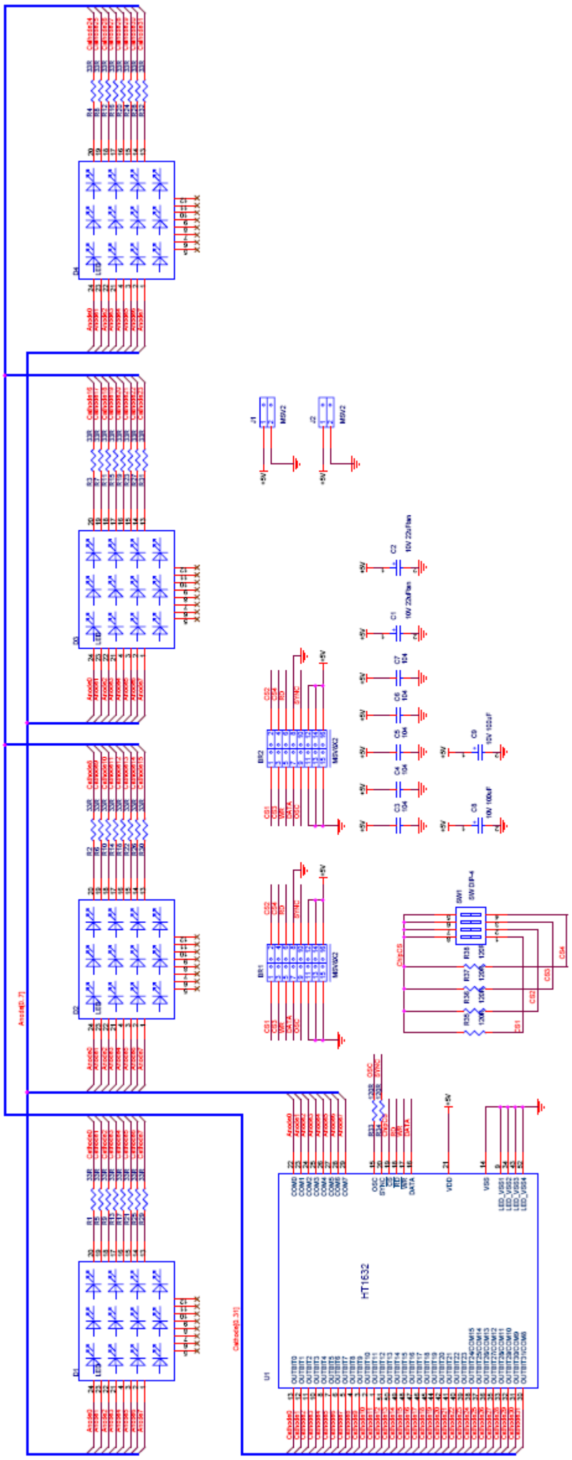


3.3. Command Summary

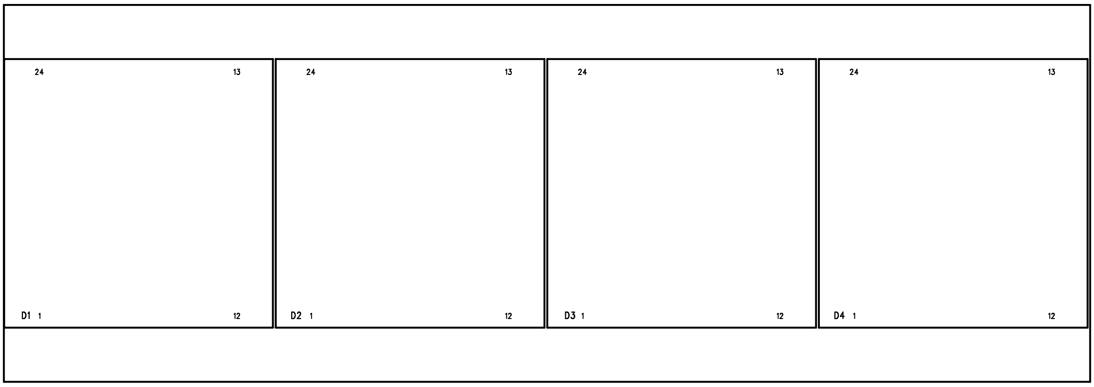
Name	ID	Command Code	D/C	Function	Def.
READ	1 1 0	A6A5A4A3A2A1A0D0D1D2D3	D	Read data from the RAM	
WRITE	1 0 1	A6A5A4A3A2A1A0D0D1D2D3	D	Write data to the RAM	
READ-MODIFY-WRITE	1 0 1	A6A5A4A3A2A1A0D0D1D2D3	D	Read and Write data to the RAM	
SYS DIS	1 0 0	0000-0000-X	C	Turn off both system oscillator and LED duty cycle generator	Yes
SYS EN	1 0 0	0000-0001-X	C	Turn on system oscillator	
LED OFF	1 0 0	0000-0010-X	C	Turn off LED duty cycle generator	Yes
LED ON	1 0 0	0000-0011-X	C	Turn on LED duty cycle generator	
BLINK OFF	1 0 0	0000-1000-X	C	Turn off blinking function	Yes
BLINK ON	1 0 0	0000-1001-X	C	Turn on blinking function	
SLAVE MODE	1 0 0	0001-00XX-X		Set slave mode and clock source from external clock	
MASTER MODE	1 0 0	0001-01XX-X		Set master mode and clock source on-chip RC oscillator, the system clock output to OSC pin	
RC	1 0 0	0001-10XX-X	C	System clock source, on-chip RC oscillator	Yes
EXT CLK	1 0 0	0001-11XX-X	C	System clock source, external clock source	
COMMONS OPTION	1 0 0	0010-abXX-X	C	ab=00: N-MOS open drain output and 8 common option ab=01: N-MOS open drain output and 16 common option ab=10: P-MOS open drain output and 8 common option ab=11: P-MOS open drain output and 16 common option	ab =10
PWM Duty	1 0 0	101X-0000-X	C	PWM 1/16 duty	
	1 0 0	101X-0001-X	C	PWM 2/16 duty	
	1 0 0	101X-0010-X	C	PWM 3/16 duty	
	1 0 0	101X-0011-X	C	PWM 4/16 duty	
	1 0 0	101X-0100-X	C	PWM 5/16 duty	
	1 0 0	101X-0101-X	C	PWM 6/16 duty	
	1 0 0	101X-0110-X	C	PWM 7/16 duty	
	1 0 0	101X-0111-X	C	PWM 8/16 duty	
	1 0 0	101X-1000-X	C	PWM 9/16 duty	
	1 0 0	101X-1001-X	C	PWM 10/16 duty	
	1 0 0	101X-1010-X	C	PWM 11/16 duty	
	1 0 0	101X-1011-X	C	PWM 12/16 duty	
	1 0 0	101X-1100-X	C	PWM 13/16 duty	
	1 0 0	101X-1101-X	C	PWM 14/16 duty	
	1 0 0	101X-1110-X	C	PWM 15/16 duty	
	1 0 0	101X-1111-X	C	PWM 16/16 duty	

Appendix

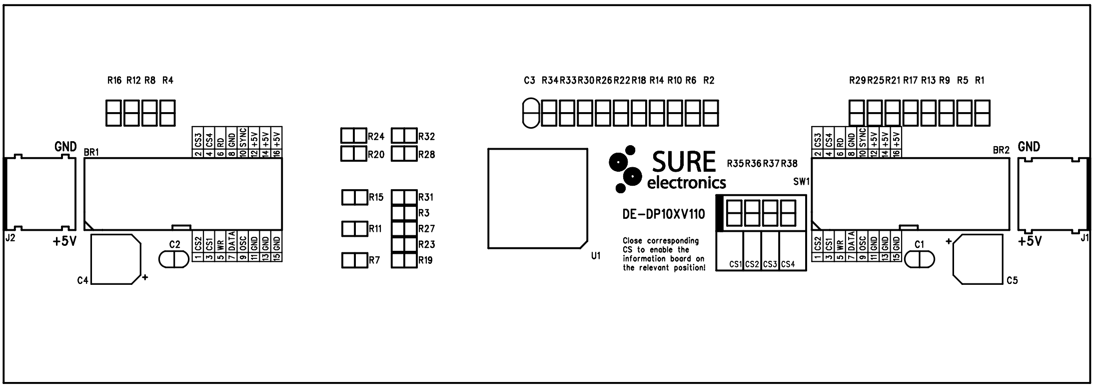
1 schematics



2 PCB Layout



TOP



Bottom

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